Upper Pleistocene Progradational (UPL P1) Play

Hyalinea "B" through Sangamon Fauna

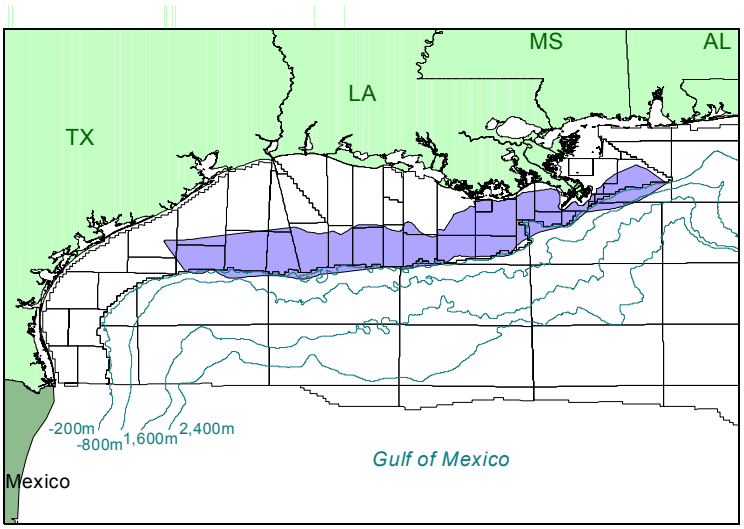

Figure 1. Play location.

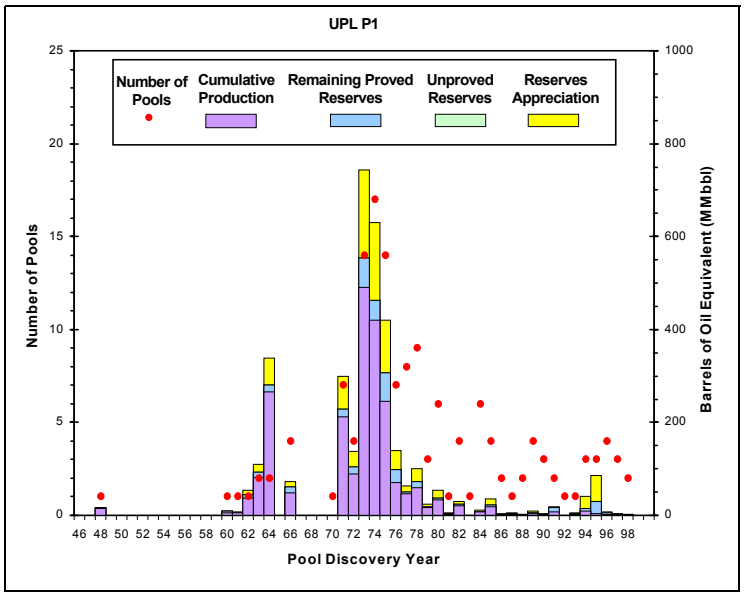

Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

UPL P1 Play 149 Pools 637 Sands	Minimum	Mean	Maximum
Water depth (feet)	39	244	922
Subsea depth (feet)	950	3969	8235
Number of sands per pool	1	4	20
Porosity	20%	32%	38%
Water saturation	16%	26%	55%

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Upper Pleistocene Progradational (UPL P1) play is the second largest play in the Gulf of Mexico Region on the basis of gas total reserves and gas mean total endowment. The play occurs within the *Hyalinea* "B," *Trimosina* "A" 2nd occurrence and *Trimosina* "A" 1st occurrence biozones, and Sangamon Fauna. This play extends from the Brazos Area offshore Texas northeastward into the Main Pass and Viosca Knoll Areas east of the present-day Mississippi River Delta (figure 1).

Updip, the play ends where the progradational deposits grade into the nearshore deposits of the Upper Pleistocene Aggradational (UPL A1) play. The UPL P1 play also extends onshore into Louisiana near the Mississippi River Delta. To the northeast and west, the UPL P1 play is limited by a lack of sediment influx at the edges of the UPL depocenter. Downdip, the play grades into the deposits of the Upper Pleistocene Fan 1 (UPL F1) play.

Play Characteristics

Sediments in the UPL P1 play represent major regressive episodes of outbuilding of both the shelf and slope. Retrogradational reworked sands with a thinning and backstepping log signature locally cap the play. Because these retrogradational sands are poorly developed and discontinuous, they are included as part of the UPL P1 play.

Almost half of the fields in this play are structurally associated with salt diapirs with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Other fields are associated with growth fault anticlines and normal faults, while some fields contain hydrocarbon accumulations trapped by permeability barriers, updip pinchouts or facies

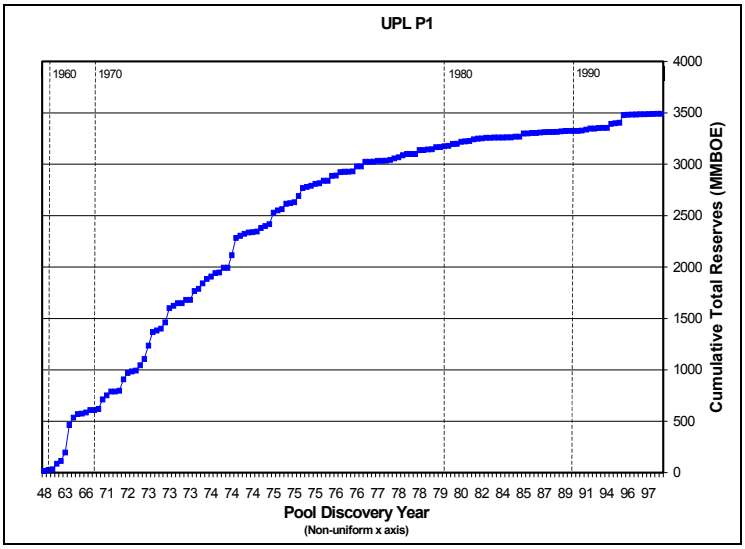

Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

UPL P1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	149	0.333	12.686	2.590
Cumulative production	--	0.253	11.105	2.229
Remaining proved	--	0.079	1.581	0.361
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	--	0.117	4.411	0.902
Undiscovered Conventionally Recoverable Resources				
95th percentile	--	0.052	1.658	0.364
Mean	66	0.116	1.873	0.449
5th percentile	--	0.210	2.092	0.567
Total Endowment				
95th percentile	--	0.501	18.755	3.856
Mean	215	0.565	18.970	3.941
5th percentile	--	0.659	19.189	4.059

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The UPL P1 gas play contains total reserves of 0.449 Bbo and 17.097 Tcfg (3.492 BBOE), of which 0.253 Bbo and 11.105 Tcfg (2.229 BBOE) have been produced. The play contains 637 producible sands in 149 pools, and all 149 of these pools contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves discovered in the play occurred in the South Timbalier 52 field in 1948 (figure 2). Discoveries peaked in the mid-1970's when maximum yearly total reserves of 744 MMBOE were added in 1973 with the discovery of 14 pools. The largest pool in the play was found in 1964 in the Eugene Island 292 field, with 267 MMBOE in total reserves (figures 2 and 3). Over 95 percent of the play's total reserves and 98 percent of its cumulative production have come from pools discovered before 1990, reflecting the maturity of the play. Twenty-two pools have been discovered in the 1990's; the most recent discoveries, prior to this study's cutoff date of January 1, 1999, were in 1998.

The 149 discovered pools contain 1,302 reservoirs, of which 977 are nonassociated gas, 244 are undersaturated oil, and 81 are saturated oil. Cumulative production has consisted of 89 percent gas and 11 percent oil.

Of the 87 assessed Gulf of Mexico Region plays, the UPL P1 play contains the second largest amount of BOE gas total reserves (7% of total gas reserves for the Region) and has produced the second largest amount of BOE cumulative production (8% of total BOE cumulative production in the Region).

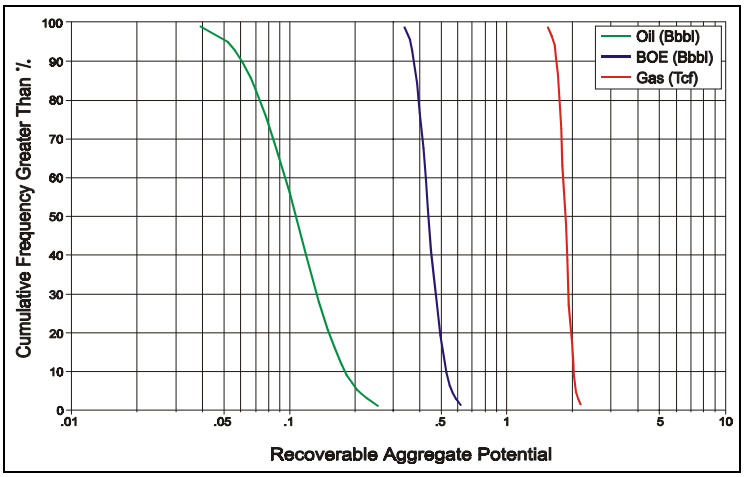

Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

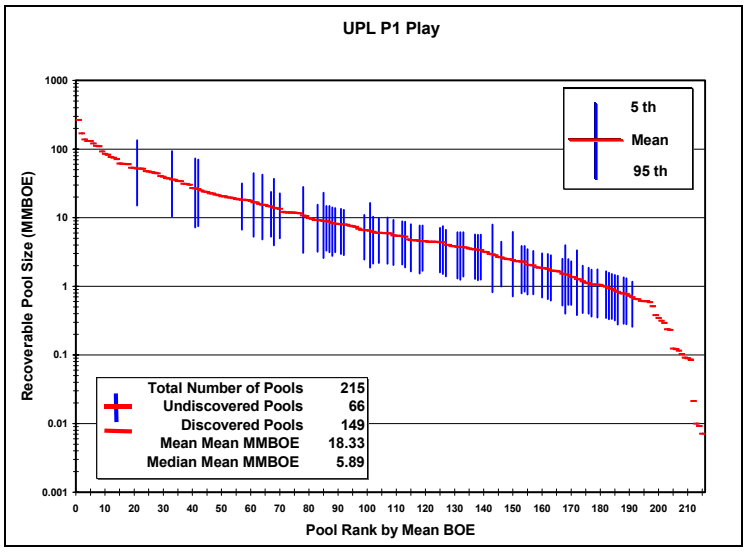

Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

Assessment Results

The marginal probability of hydrocarbons for the UPL P1 play is 1.00. This play has a mean total endowment of 0.565 Bbo and 18.970 Tcfg (3.941 BBOE) (table 2). Fifty-seven percent of this BOE mean total endowment has been produced.

Assessment results indicate that mean undiscovered conventionally recoverable resources (UCRR) have a range of 0.052 to 0.210 Bbo and 1.658 to 2.092 Tcfg at the 95th and 5th percentiles, respectively (figure 4). The mean UCRR resources are estimated at 0.116 Bbo and 1.873 Tcfg (0.449 BBOE). Of the 13 progradational plays in the Gulf of Mexico Region, the UPL P1 is forecast to contain the most UCRR. These undiscovered resources might occur in as many as 66 pools. The largest undiscovered pool, with a mean size of 52 MMBOE, is forecast as the 21st largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 33, 41, 42, and 57 on the pool rank plot. For all the undiscovered pools in the UPL P1 play, the mean mean size is 7 MMBOE, which is smaller than the 23 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 18 MMBOE.

The UPL P1 is a supermature play with BOE mean UCRR contributing 11 percent to the play's BOE mean total endowment. Recently, shallow gas sands (1,000 to 3,000 feet subsea) have become an attractive target for several exploration companies. This trend is noted for being largely ignored by exploration companies until lately because the gas was considered too underpressured to be economic. The shallow gas creates good seismic hydrocarbon indicators (bright spots) and the sands are characterized by very high porosity and permeability. Faulted traps are frequently associated with hydrocarbon seeps at the seafloor. With 3D seismic data, drilling risks are very low.